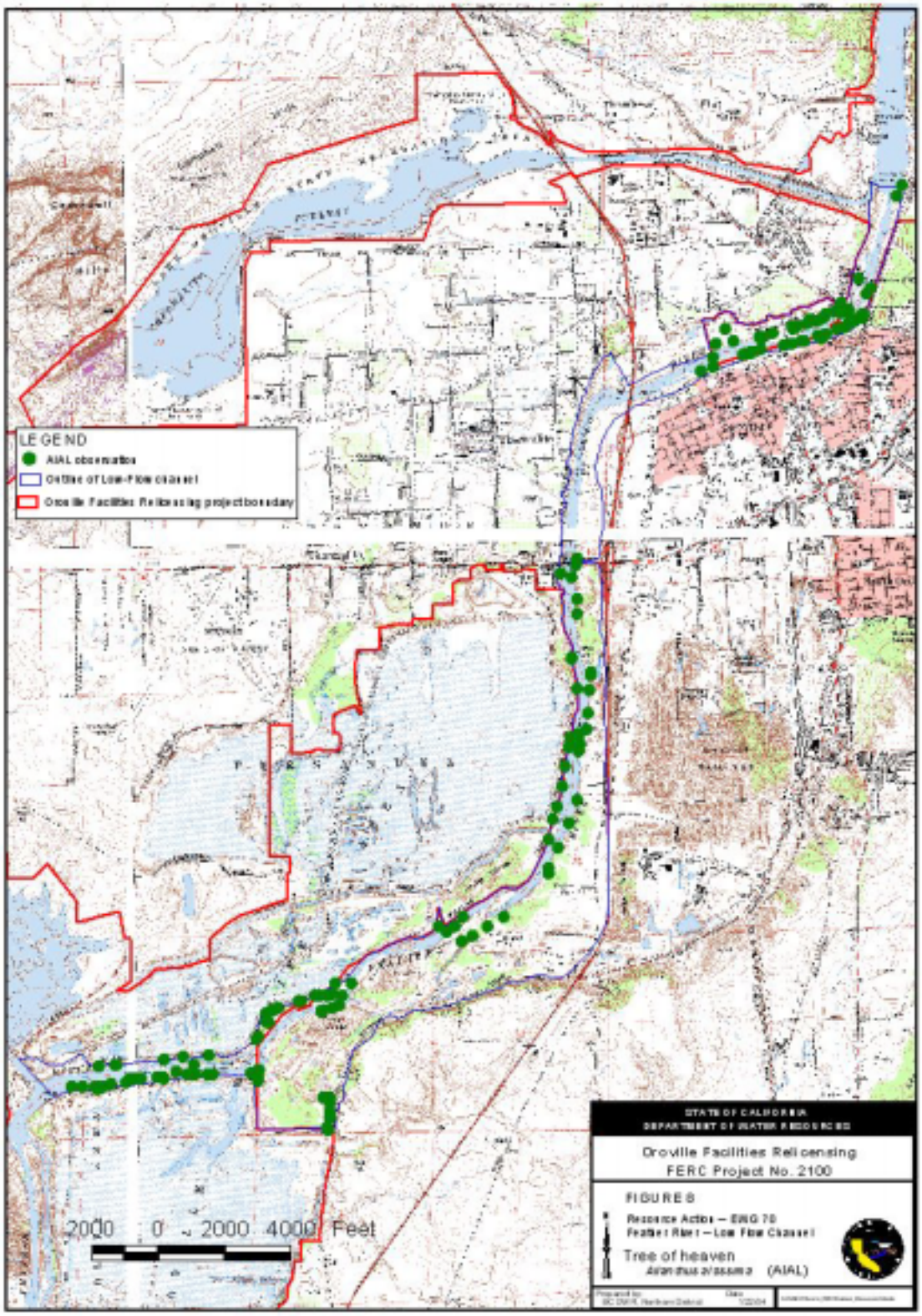
Tree of heaven (*Ailanthus altissima*) is a rapidly growing, deciduous tree that is native to China (Figure 7). In California, it is widely naturalized and is found mainly in wastelands and disturbed, semi-natural habitats, however, it also occurs in riparian and other naturally disturbed habitats (Bossard 2000). Seedlings establish themselves by producing a well-formed taproot in less than three months. Trees can also produce numerous suckers from the roots and resprout vigorously from cut stumps and root fragments, especially following a fire. It can successfully outcompete native vegetation, especially in riparian areas, by producing toxic chemicals that inhibit the establishment of other species.

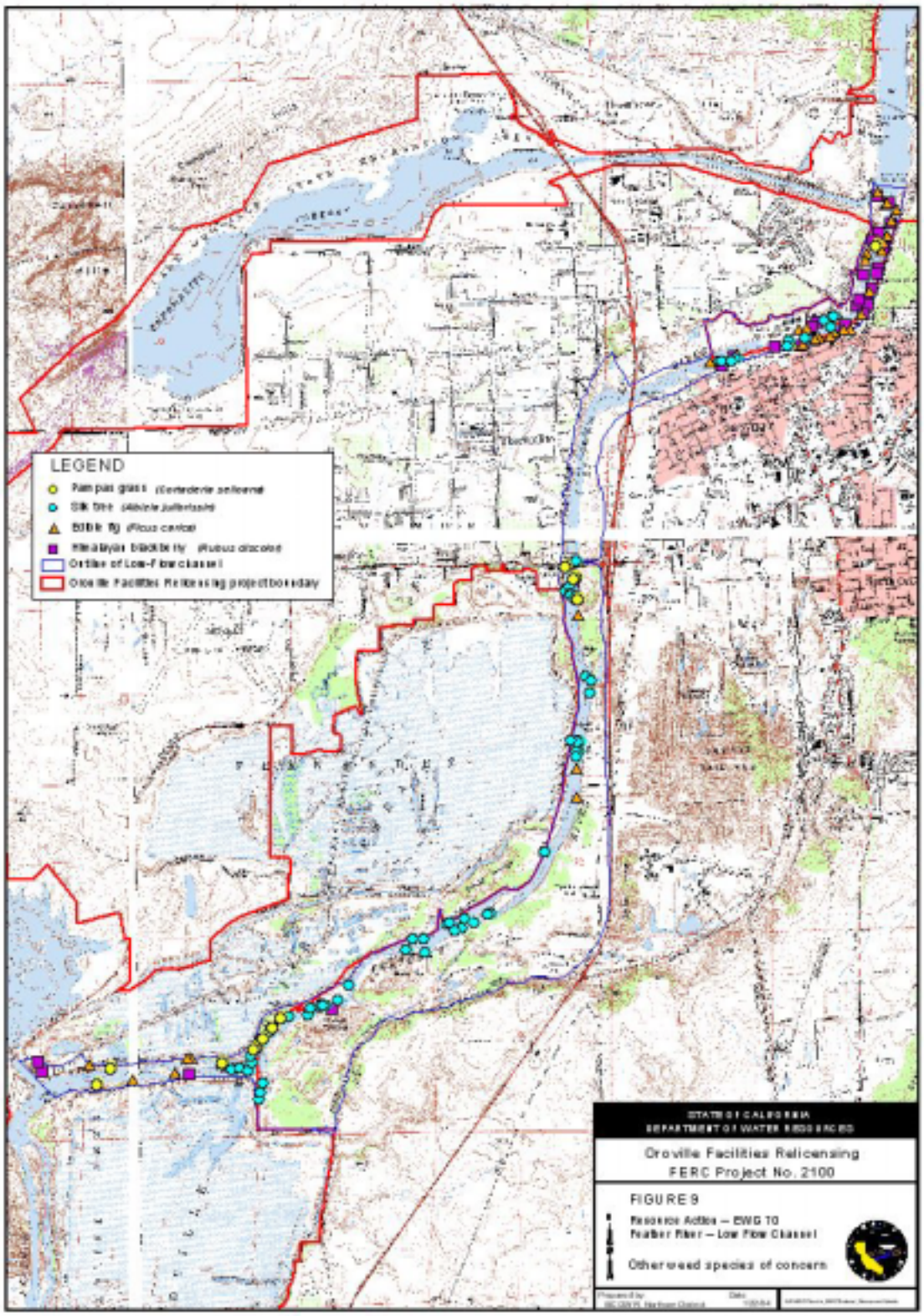
Figure 7. Tree of heaven.

Tree of heaven is common throughout the project area and is found along the entire reach of the low flow channel and appears to be increasing its range (Figure 8). In much of the OWA and in a few areas along the low-flow channel, it is commonly found with the valley elderberry. Surveys have not been completed for the River Bend Park area.

Control methods for this species usually require more than one method, multiple-year treatments, and follow-up monitoring. Physical controls involve hand pulling; cutting or girdling the trees, hand digging to remove all parts of the tree, and prescribed burns. Because these trees are prolific stump and root sprouters, additional control measure are necessary with each of these treatments. Chemical control involves application to the leaves, basal bark, cut stumps, or injected into wounds or cuts. Foliar sprays should not be used where non-target species are nearby. Applying herbicides directly to the tops of freshly cut stumps is the most effective technique with little chance for damage to adjacent vegetation (Bossard 2000).


LEGEND
AIAL observation
Outline of Low-Flow channel
Oroville Facilities Relicensing project boundary
2000 0 2000 4000 Feet
Oroville Facilities Relicensing
FERC Project No. 2100
FIGURE 8
Tree of heaven
(AIAL)

Other noxious weed species of concern: Other species found along the low flow channel that may be included in a weed management plan for the area include pampas grass (*Cortaderia selloana*), fig (*Ficus carica*), and Himalayan blackberry (*Rubus discolor*). These species are common throughout the OWA, but not widespread (Figure 9). An additional 33 non-native species were mapped along the low-flow channel of the Feather River.


LEGEND
Oroville Facilities Relicensing
FERC Project No. 2100
FIGURE 9
Other weed species of concern

Design Considerations and Evaluation:

This resource action would not require any change to current flow operations, although yearly flushing flows may help prevent some noxious plant species from becoming established. Some species have very specific time frames for control (i.e. purple loosestrife). For others, control may be more effective during certain times of the year. In order to keep costs down, control efforts for all target species should be combined to the extent possible.

Control efforts for purple loosestrife are most effective when conducted during July and August when the plants are flowering and most visible. According to Bell (1997) application of herbicides to giant reed is most effective during mid-August to November. For others, no specific timing of efforts is indicated.

Control efforts will need to be a yearly event. However, it is estimated that efforts will be more concentrated in the first year or two, with lighter follow-up controls in each of the following years as eradication and/or control of the populations are achieved. A monitoring regime should be put in place that will inventory and map priority weed species as well as identify the effectiveness of the control methods. The monitoring program should identify areas that are not naturally regenerating and need to have follow-up restoration at the site.

Restoration:
Restoring/planting with native species may be necessary following control treatments for some species. Control treatments for species such as scarlet wisteria, giant reed, and tree of heaven may involve cutting the stalks or trunks and applying an herbicide to kill the entire plant including the root mass. In some areas where the infestation density is high, stump removal may be necessary. These areas should be replanted with native species. Removal and planting will not only help reduce erosion and speed up the restoration process, but may also shade out seedlings of non-native species and help prevent reestablishment. Appropriate native woody species that can be used in this area include white alder (*Alnus rhombifolia*), willow species (*Salix* spp.), Fremont cottonwood (*Populus fremontii*), Western sycamore (*Platanus racemosa*), box elder (*Acer negundo*), and Oregon ash (*Fraxinus latifolia*). A number of other herbaceous/non-tree-like perennial species can be used including sedges (*Carex* sp.), rushes (*Juncus* sp.), deer grass (*Muhlenbergia rigens*), mugwort (*Artemmisia douglasiana*), mule fat (*Baccharis salicifolia*), and coyote bush (*Baccharis pilularis*).

Replanting with these species, especially near the water's edge may help increase shaded riverine habitat, however removal near the water's edge may temporarily affect water quality.

Permitting:
Consultations with NOAA and USFWS may be necessary if any impacts to federal special status species are identified. A Streambed Alteration Agreement from the Department of Fish and Game for alterations to riparian resources may also be needed.

No NPDES permit is anticipated. An Interim Statement and Guidance letter issued by the U.S. Environmental Protection Agency on July 11, 2003 addressed whether a National Pollutant Discharge Elimination System (NPDES) permit under section 402 of the Clean Water Act is required for applications of pesticides to waters of the United States that comply with relevant requirements of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). It states that the application of pesticides in compliance with relevant FIFRA requirements is not subject to NPDES permitting requirement when the application is to control pests. EPA is soliciting comments on this interim statement through the Federal Register prior to determining a final agency position (U.S. Environmental Protection Agency 2003).

Species such as scarlet wisteria that occurs mainly at the waters edge in this reach may need additional permits if removal is necessary.

Tree of heaven is intermingled in a number of areas with valley elderberry bushes (habitat for the federally threatened valley elderberry longhorn beetle) and appears to be expanding. Although removal of the tree of heaven may temporarily impact the elderberry plants, it's believed that in the long-term it will improve the habitat. In areas where the two species coexist, the taller tree-of-heaven will eventually shade out and replace the existing elderberry bushes. Expansion of the tree of heaven will further impact available habitat.

Synergism and Conflicts:

The goal of this resource action is to eliminate and/or control noxious weed species in the low flow reach. Other resource actions listed above address weed control in the OWA, Thermalito Complex, and around Lake Oroville. Each of these resource actions also has a replanting/restoration component. An overall Weed Management Plan for the Project Area would increase the likelihood of success for eradication and control of these species and ultimately decrease the invasion into downstream waters and habitats.

Removal of noxious weed species and replanting with native species would compliment those resource actions that address riparian/wetland and upland habitats, as well as those that address special status species habitats.

No potential conflicts with other resources or resource actions have been identified at this time.

Uncertainties:

Uncertainties include:

- effectiveness of control and eradication methods
- long-term costs
- determining time frame for controlling weed populations
- impacts to plant and animal species that may be added to special status lists in the future
- addressing control of other species that may become high priority weed species in the future

Cost Estimate:

An initial cost estimate for this resource action is difficult because:

- costs will vary depending on method or methods used. A mix of techniques may be appropriate
- a weed control and restoration plan in the low-flow channel will be part of a larger weed management plan for the Project Area
- the uncertainties in predicting success of management methods and advances in technology or strategies over time
- costs will be higher for the first year or two, but should decline over time

The following are anticipated costs for Year 1 and Year 2. Costs should decrease over time.

Herbicides:	$ 2,000
Equipment:	2,000
Labor:	20,000
Monitoring:	5,000
Restoration:	15,000
Permitting:	5,000
Total per Year 1 & 2	$ 49,000

Recommendations:

This resource action should be combined with other resource actions that target the eradication and/or control of noxious weed species. A weed management plan for the project area and project-affected area should be developed using an adaptive management strategy. This plan should include management goals and objectives, priorities, implementation strategies, cost and time estimates, restoration, and monitoring to assess impacts of management activities and effectiveness of methods.

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